# Jim Shell


**VT-WIN**

**An**

**Automated Optical Inspection System**

**(AOI System)**

# Problems with Past AOI Systems

- 100% Visual Inspection
  - ➔ Approximately 80% of Defects Found First Pass
- Automated Visual Cameras
  - ➔ Good for Assembly Defects
  - ➔ Poor for Solder Defects
- X-Ray
  - ➔ Long Learning Curve
  - ➔ Difficult to Interpret Print Outs

# Past Capabilities

- Character Recognition
  - ➔ Part Values
- Missing Components
  - ➔ Part Not Placed at All
- Misalignment
  - ➔ Horizontal or Vertical Shift
- Polarity
  - ➔ Incorrect Part Placement

# Latest Technology

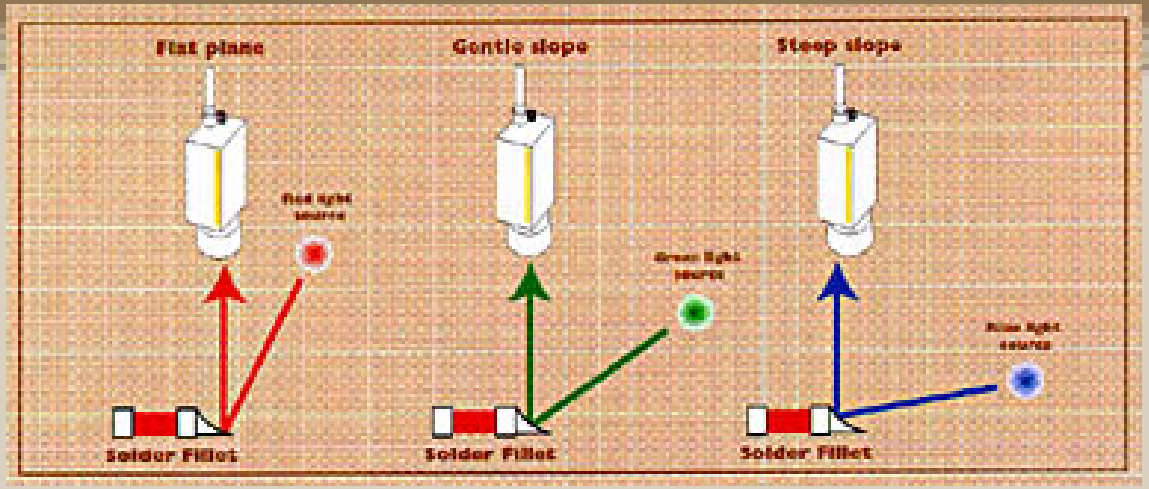
- Full Color Analysis
  - ➔ Does Not Convert to Grey Scale
- Negligible Machine Creep
  - ➔ One Stationary Camera
- High Reliability and Repeatability
- **Solder Joint Inspection**
  - ➔ Not Limited to Component Problems

# Solder Joint Inspection

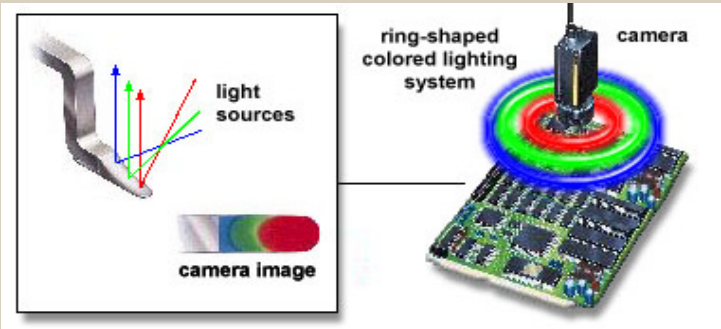
- Missing Solder
- Insufficient Solder
- Excess Solder
- Poor Wetting
- Blow Holes
- Contaminated Solder

# VT-WIN

- First System To Use Full Color Analysis
  - ➔ Shading of Components Adversely Affect Grayscale
- One Stationary Camera
  - ➔ Multiple Moving Cameras can Lead to Inaccuracies Attributed to Creep

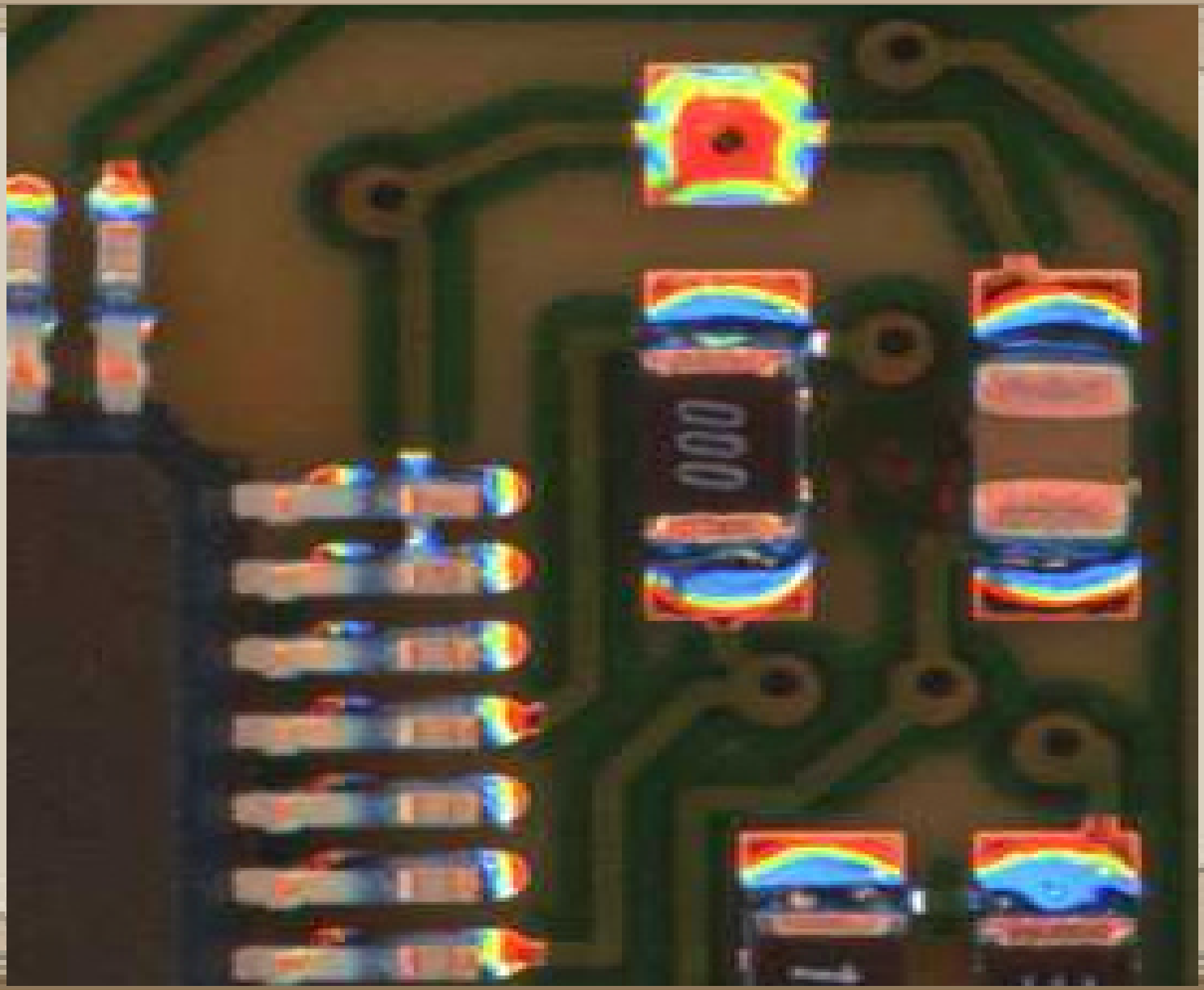



**The camera *captures these three colors* as they reflect off the board's surface...**

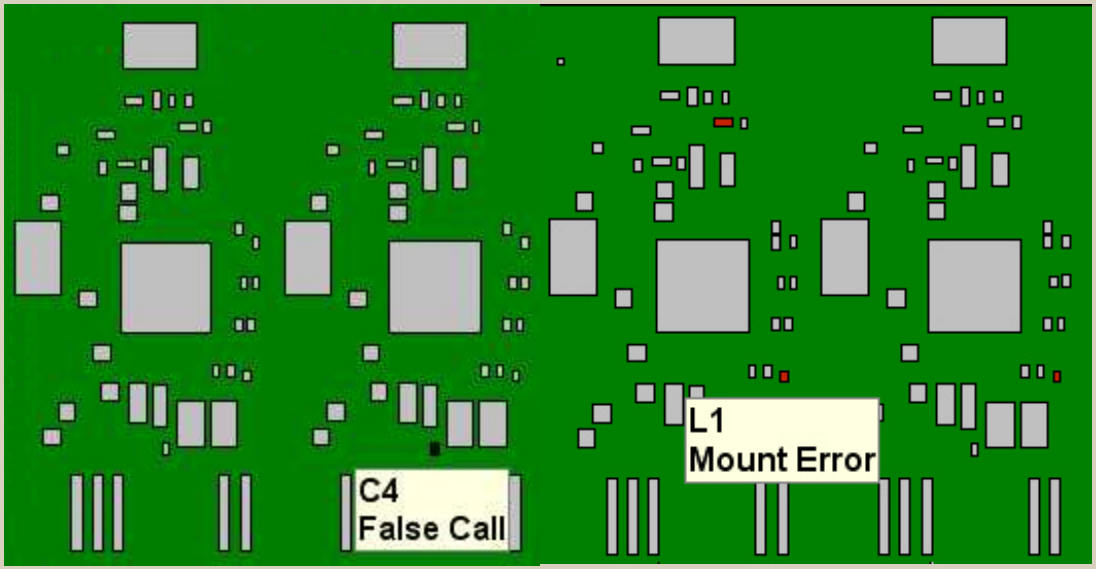




**...and this allows a two dimensional image to convey *three dimensional information*, making possible accurate identification of solder (wettability) and component defects**



# Inspection




- Boards are Inspected Using Barcodes and the Results are Sent to a Rework Station where Calls are Verified by an IPC Certified Inspector
- Inspection Results are Easily Retrieved and Interpreted

# Inspection

- The Inspector has the option of Agreeing or Overruling any call by the AOI System
- Statistical Data can be Divided by Day, Lot, Sub-Lot, Board, Components, Etc.
- The Inspectors Verification Results for each Board are Saved and can be Retrieved at a Later Date using the Barcode

# Results

- More Than 99% Repeatable
- An Inspection Rate of Approximately 20msec per Component
- Inspection, Verification, and Rework are All Completed in 1/10$^{th}$ the Time that was Required Previously just for Manual Inspection
- Real-time Inspection Feedback Prevents Mass Production of Potential Problems